

A new genus and four new species of South African stick insects

Paul D. Brock, Department of Entomology, The Natural History Museum, Cromwell Road, London, SW7 5BD, U.K.

Address for correspondence: "Papillon", 40 Thorndike Road, Slough SL2 1SR, U.K.

Abstract

An interestingly shaped new species from the Eastern Cape is described in a new genus, *Gratidiinilobus* n.gen. The sole representative, *G. capensis* n.sp., is designated as type species for the genus, which belongs to the subfamily Pachymorphinae, tribe Gratidiini. Also described from the same tribe are *Clonaria capelongata* n.sp. (Northern Cape), *Maransis browni* n.sp. (Northern Cape). *Xylica tomsi* n.sp. (Eastern Cape and Northern Province) belongs to the subfamily Bacillinae, tribe Xylicini. Other minor taxonomic changes are made relating to *Clonaria* species found in South Africa.

Key words

Phasmida, *Gratidiinilobus* new genus, *Clonaria*, *Maransis*, *Xylica*, new species, South Africa.

Introduction

In a recent catalogue of the world Phasmida, Otte & Brock (2003) listed 31 species from South Africa. As with the giant stick insects of the genera *Bactrododema* Stål, 1858, *Palophus* Westwood, 1859 and *Bactricia* Kirby, 1896 (revised in Brock, 2004), a revision is necessary in order to evaluate the fauna, particularly as many synonyms of phasmid species have not yet been established in this understudied order (Brock 1999). As part of a detailed study on southern African phasmids (in progress), this paper describes four new species found in South African museum collections. All these species occur in the Eastern or Northern Cape, areas which have been rather neglected by collectors. The classification used follows Otte & Brock (2003), which is an updated version of Bradley & Galil (1977).

Material and Methods

This study is based on the examination of South African material in several museum collections, also Afrotropical type material, where necessary. During a visit to Pretoria in May 2003, I found undescribed material of interesting species in the National Collection of Insects, Pretoria (SANC), and Transvaal Museum, Pretoria (TMSA) collections. After submitting this paper for publication, I also located specimens of the new genus in The Natural History Museum, London (BMNH).

Abbreviations for Depositories

BMNH The Natural History Museum, London, U.K.

SAMC South African Museum, Cape Town, South Africa.

SANC National Collection of Insects, Pretoria, South Africa.

TMSA Transvaal Museum, Pretoria, South Africa.

Bacillidae, subfamily Bacillinae, tribe Xylicini

Xylica Karsch

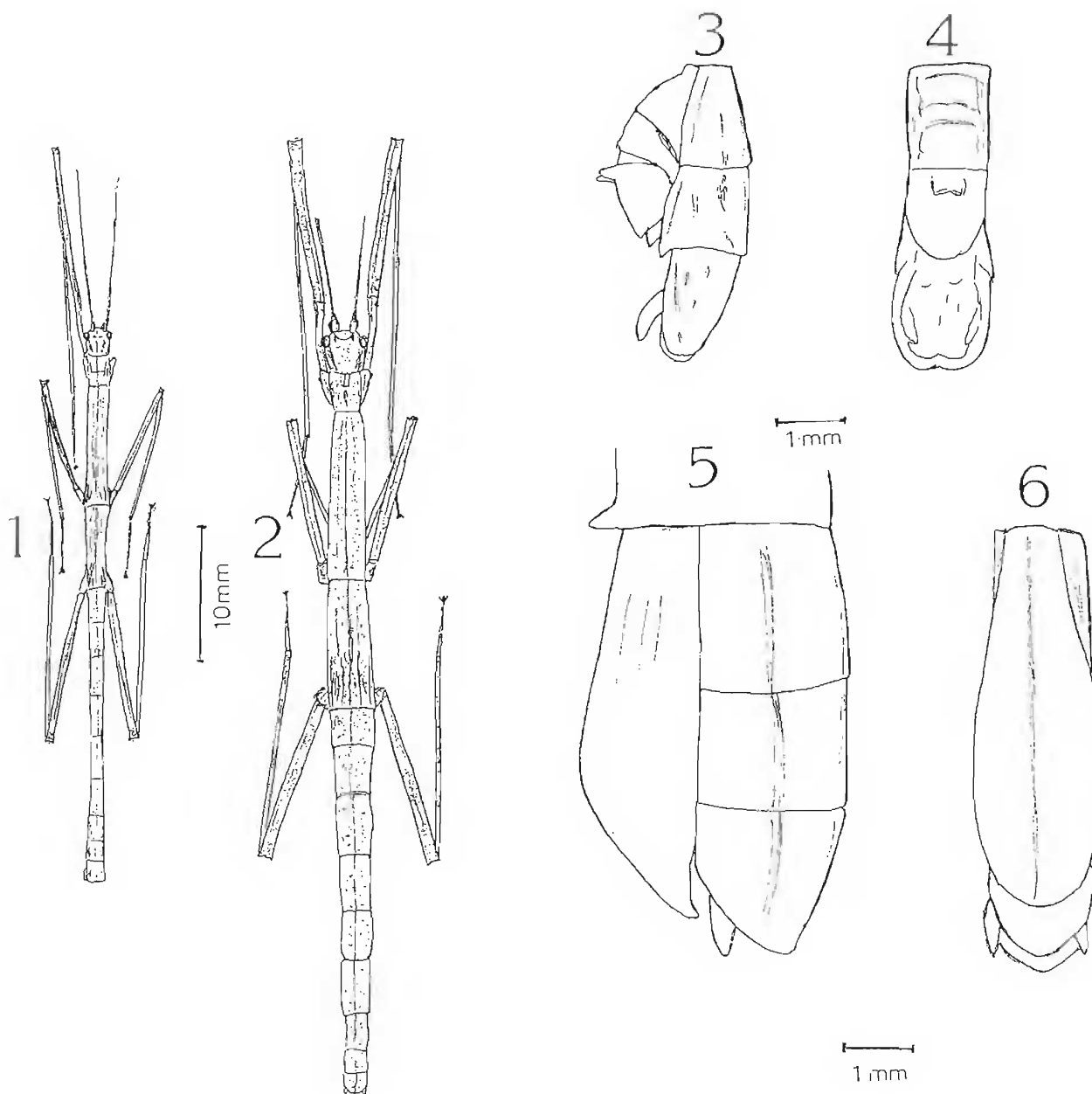
Xylica Karsch, 1898: 365, 381. Type species. – *Xylica oedematosa* Karsch, 1898, by monotypy.

Xylica; Kirby, 1904: 404; Redtenbacher, 1906: 29; Otte & Brock, 2003: 41.

Xylica tomsi n.sp., Figs 1-6.

Male (Figs. 1, 3 & 4)

Holotype: Small mid brown insect with bold central carina, mottled with darker shades, including bandings on legs. Body length 41mm.



Figs 1-6 *Xylica tomsi*

1. Holotype male. 2. Female. 3-6: Ventral and lateral views of abdomen, 3-4. ♂, 5-6. ♀.

Head slightly longer than wide, fairly smooth. Pair of stout raised tubercles between eyes. Head with dark blackish-brown central carina; darker brown bands from eye to posterior, with further broader band beneath. Central dark blotches also present. Posterior with five swollen ridges. Antennae dark brown, short, not reaching end of fore femora. hairy; 22 segments. Basal segment depressed, broad; second segment reduced in length but broader than subsequent segments.

Thorax sparsely granulated, with bold central carina. Pronotum slightly longer than

head, slightly granulated and hairy. Posterior half of pronotum slightly raised, sharply ridged. Mesonotum fairly smooth, more than four times length of pronotum; mid-brown, with darker areas towards hind part of segment. Metanotum and indistinct median segment shorter than mesonotum.

Abdomen elongate, sparsely granulated, with a mixture of darker markings. Segments 1-7 of similar length; 8th segment swollen and shorter; 9th segment shorter than 8th; anal segment slightly longer than 9th, hind margin subtruncate. Cerci short, rounded at tip; hidden beneath anal segment. Subgenital plate broad and swollen, conspicuously double spined in centre; end rounded, reaching end of 9th abdominal segment (Figs 3-4).

Legs plain, slightly hairy, indistinctly mottled. All femora with short apical spines; apices rather darker. Right fore leg missing.

Paratype males (2 specimens, in copula with females). Same as holotype except shorter.

<i>Xylica tomsi</i> measurements (in mm)	Holotype ♂	Paratype ♂	Paratype ♀
Body length	41	36-37	55-60
Head	1.7	1.7	3
Antennae	12	11	9
Pronotum	2	1.5	2.5-2.8
Mesonotum	8.5	8	12-13
Metanotum & median segment	6	6	9.5
Femora: fore	15	13	17-18
Femora: mid	8.5	8.5	10-11
Femora: hind	11	10	12
Tibiae: fore	17	15	21
Tibiae: mid	9.5	8	11.5-12
Tibiae: hind	13	12.5	15
Cerci	0.8	0.8	0.6

Table 1. Measurements of *Xylica tomsi* n.sp.

Female (Figs. 2, 5 & 6)

Paratype females: three specimens, including two mounted in copula with males. These range from mid-brown, hardly mottled, to heavily mottled all over with darker blackish-brown spots and blotches and mottled legs. Robust looking, with bold double spined head. Central longitudinal carina and two others run whole length of insect. Body length of adults 55-60mm.

Head as in male except for pair of bold spines between eyes. Darker brown bands from eye to posterior, with further broader band beneath (lighter on pale insects). Antennae shorter than in male, with 21-22 segments.

Thorax granulated. Pronotum not quite as long as head, slightly granulated and ridged, with central indentation. Mesonotum conspicuously granulated, more than four times length of pronotum. Metanotum and indistinct median segment shorter than mesonotum.

Abdomen as in male except as follows: end of segment not quite rounded. Operculum boat shaped, end not quite rounded, not reaching end of anal segment (Figs 5-6). Opercular spine a broad, stout tubercle.

Legs as in male.

Measurements

Measurements of both sexes (in mm) are given in table 1.

Type material

Holotype ♂, South AFRICA: Bedford, Marlepekop, SE2430DB, 20-21.ii.1988 (R. Stals) (TMSA). Paratypes: All South Africa: ♀, Bedford, Marlepekop, SE2430DB, 20-21.ii.1988 (R. Stals); 2♂♂, 2♀♀ - collected [and mounted] in copula, Hanglip Forest, Louis Trichardt, 2229DD U344, 10.xii.1984 (R. Toms) (all TMSA).

Distribution

So far only known from Bedford (Eastern Cape) and Louis Trichardt (Northern Province), suggesting that this species has been overlooked at other localities.

Etymology

Named after Rob Toms, a specialist in Orthoptera (Transvaal Museum), who collected two pairs of this species. Dr Toms has obtained many interesting phasmids during his collecting trips in South Africa.

Notes

X. tomsi is closest to *X. abbreviata* Redtenbacher, 1906, from Tanzania. Key differences are given in table 2.

Characteristic	<i>tomsi</i>	<i>abbreviata</i>
Body length	♂ 36-41mm, ♀ 55-60mm.	♂ 56mm, ♀ 75mm.
Antennae	Shorter than fore femora in both sexes; those of ♂ longer than ♀.	Longer than fore femora in ♂ Equal to fore femora in ♀.
Abdominal segments of ♀	Lacking central spine-like tubercle at end of abdominal segments.	With central spine-like tubercle at end of abdominal segments.
Genitalia	♂ subgenital plate with conspicuous pair of spines. ♀ opercular spine a broad tubercle.	♂ subgenital plate lacking spines. ♀ opercular spine absent.

Table 2. Differences between *X. tomsi* and *X. abbreviata*.

Diapheromeridae, subfamily Pachymorphinae, tribe Gratidiini

***Clonaria* Stål**

Clonaria Stål, 1875a: 5. Type species: *Bacillus natalis* Westwood, 1859: 6, pl. 23: 7-8, by subsequent designation of Kirby, 1904: 337.

Clonaria; Stål, 1875b: 14, 71; Kirby, 1904: 337; Brunner, 1907: 217 (synonym of *Gratidia*); Rehn, 1933: 61; Otte & Brock, 2003: 263 [which includes other references].

Gratidia Stål, 1875b: 14, 70. Type species: *Gratidia sansibara* Stål, 1875b: 14, 70, by original designation.

Gratidia; Kirby, 1904: 330; Brunner, 1907: 217; Rehn, 1933: 61; Otte & Brock, 2003: 262.

Paraclonaria Brunner, 1893: 89. Type species: *Paraclonaria hamuligera* Schulthess, 1898: 83, by subsequent designation of Rehn, 1904: 83.

Paraclonaria; Rehn, 1904: 83; Kirby, 1904: 335; Brunner, 1907: 217 (synonym of *Gratidia*); Otte & Brock, 2003: 262.

Many of the 130 or so species of *Gratidia* Stål, 1875 have been confused with other genera, and for many years were included in *Ramulus* Saussure, 1862 (Otte & Brock, 2003). All former *Gratidia* species should now be placed in *Clonaria* Stål, 1875, which pre-dates *Gratidia*. *Clonaria* appeared in Stål, 1875a: 5, whereas *Gratidia* first appeared in 1875b: 14, 70, as clarified by Rehn (1933) and Cliquennois (in press).

***Clonaria capelongata* n.sp., Figs 7-9.**

Male (Figs. 7-9)

Holotype: Smooth, brown, very elongate species with lateral longitudinal darker brown lines on head and thorax, less distinct on abdomen. Body length 55mm.

Head three times longer than wide, smooth. Eyes large, dark brown. Broad dark brown lateral band running from alongside eye to back of head; either side of band paler. Broad central spear-like indentation between eyes, then narrow central groove to back of head. Slightly darker brown band either side of median line and narrower darker line between this and lateral dark band mentioned above. Antennae short, just over half length of femora, with 17 segments. Basal segment slightly broader, second segment reduced in length.

Thorax elongate. Pronotum clearly shorter than head, with darker brown central cross-like indentation and narrow, darker brown longitudinal lines either side of central line on upper half of segment. Mesonotum eight times length of pronotum. Metanotum slightly shorter than mesonotum; median segment short. Both mesonotum and metanotum with central and almost lateral narrow dark brown and blackish longitudinal lines. Area beneath outer lines narrowly cream, only conspicuous on hind part of both segments.

Abdomen darker brown and blackish narrow central longitudinal line present, along with two lines either side, the latter indistinct at times, particularly towards hind part (7th-10th segments). Abdomen elongate, with segments 8-10 rather swollen towards a rounded anal (10th) segment; final segments reduced in length compared with segments 2-7. Subgenital plate small, reaching end of 9th abdominal segment, tip subtruncate (Figs 8-9). Cerci long, thin, clubbed tip.

Legs plain brown, very elongated. All femora with short pair of apical spines.

Paratype male description same as holotype, except smaller (52mm).

Measurements

All measurements are in millimetres. Holotype ♂: Body length 55, Head 2.5, Antennae 12, Pronotum 1.5, Mesonotum 12, Metanotum 10.3 Median segment, 0.7. Femora: fore 24, mid 20, hind 22. Tibiae: fore 29, mid 23, hind 27. Cerci 1.5. Paratype ♂: Slightly shorter in all features when compared with holotype.

Type material

Holotype ♂, South Africa: Groblershoop, Northern Cape, 28°53'S, 21°59'E, 20-24.iii.1989 (C.M. Moolman) (SANC). Paratype ♂, South Africa: Groblershoop, Northern Cape, 28°53'S, 21°59'E, 20-24.iii.1989 (C.M. Moolman) (SANC).

Distribution

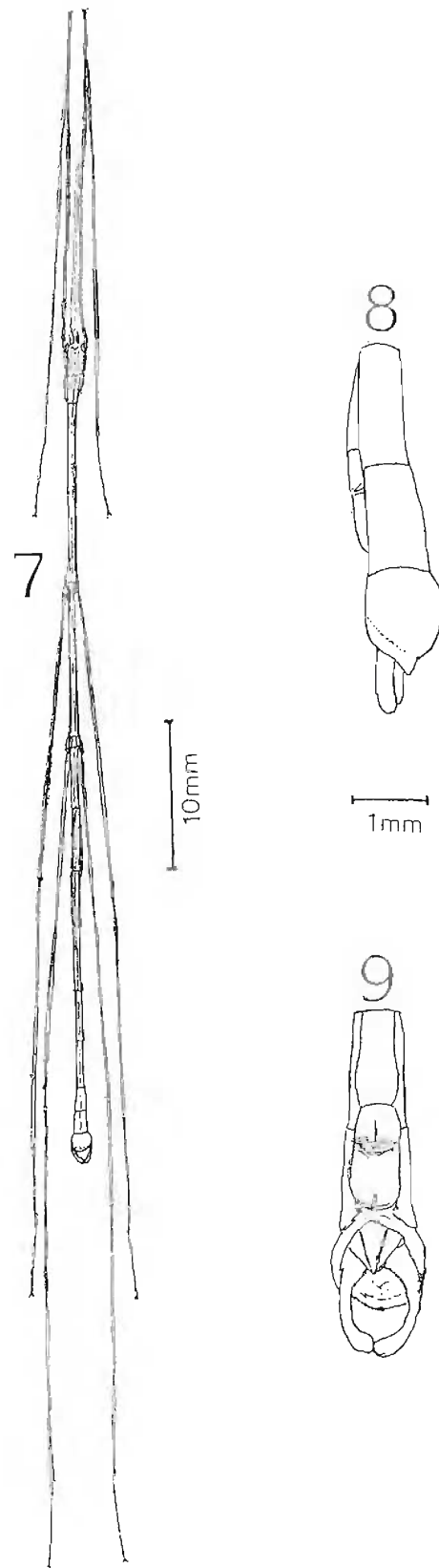
So far only known from the type locality Groblershoop in Northern Cape.

Etymology

Cape from [Northern] Cape, and elongate from the appearance of this species.

Notes

Closely related to the widespread South African species *Clonaria natalis* (Westwood, 1859) which is likewise remarkably elongate, rather than less slender, South African species (see Table 3 below). *Clonaria* species with broader males include: *C. guenzii* (Bates, 1865) (male sex only known so far) which is not a synonym of *natalis*, as recorded by Brunner, 1907. *C. pulchrepecta* (Carl, 1913) is a new synonym of *guenzii* n.syn., based on examination of the types. *Clonaria longithorax* Brunner, 1907, is known from a male from Transvaal. *Clonaria annulata* (Westwood, 1859) n.comb. [here transferred from the genus *Leptynia*] occurs in Western Cape. I am aware of a *Clonaria* sp. female from Table Mountain, Cape Town (SAMC), but am hesitant to describe it without matching opposite sexes. Having reviewed *Clonaria* species from southern Africa as well as other Afrotropical *Clonaria*, I am confident that *capelongata* has not already been described.



Figs 7-9. *Clonaria capelongata* n.sp
7. Holotype male.
8-9. End of abdomen of male.

Characteristic	<i>capelongata</i>	<i>natalis</i>
Colour	Brown with lateral darker brown longitudinal lines on head and thorax, less distinct on abdomen	Black with pale lateral longitudinal lines and brown legs
Body	Elongate	Even more slender than <i>capelongata</i>
Antennae	17 segments	18-19 segments

Table 3. Differences between males of *Clonaria capelongata* and *Clonaria natalis*.

Gratidiinilobus new genus

Rather more robust than many representatives of the tribe Gratidiini, the new genus and species described below readily key to the tribe, but have unique characteristics, rarely seen in phasmids (bold lobes on the head, thorax and abdomen). The egg has a close affinity with *Clonaria*, *Leptynia* and others.

Type species: *Gratidiinilobus capensis* n.sp., here designated.

Characteristics of the genus

Apterous. Females small and fairly stout, with body rugose and granulated; male more slender. Head with pair of slightly separated tubercles and lobes between eyes in female (in male swollen elevation). Antennae very short, with nine segments in female, ten in male; basal segment depressed, lamellate. Series of robust lateral lobes on abdominal segments 2-7 (paired lobes at hind part of mesonotum and metanotum). Abdomen elongate, narrowing towards tip in female. Female operculum short, reaching about end of 8th abdominal segment, with valvulae extending beyond that; subgenital plate in male reaching end of 9th abdominal segment. Cerci of moderate length, in female, longer and incurved in male with subbasal spur. All femora with pair of short apical spines.

Etymology

Lobed Gratidiini

***Gratidiinilobus capensis* n.sp. Figs 10-17.**

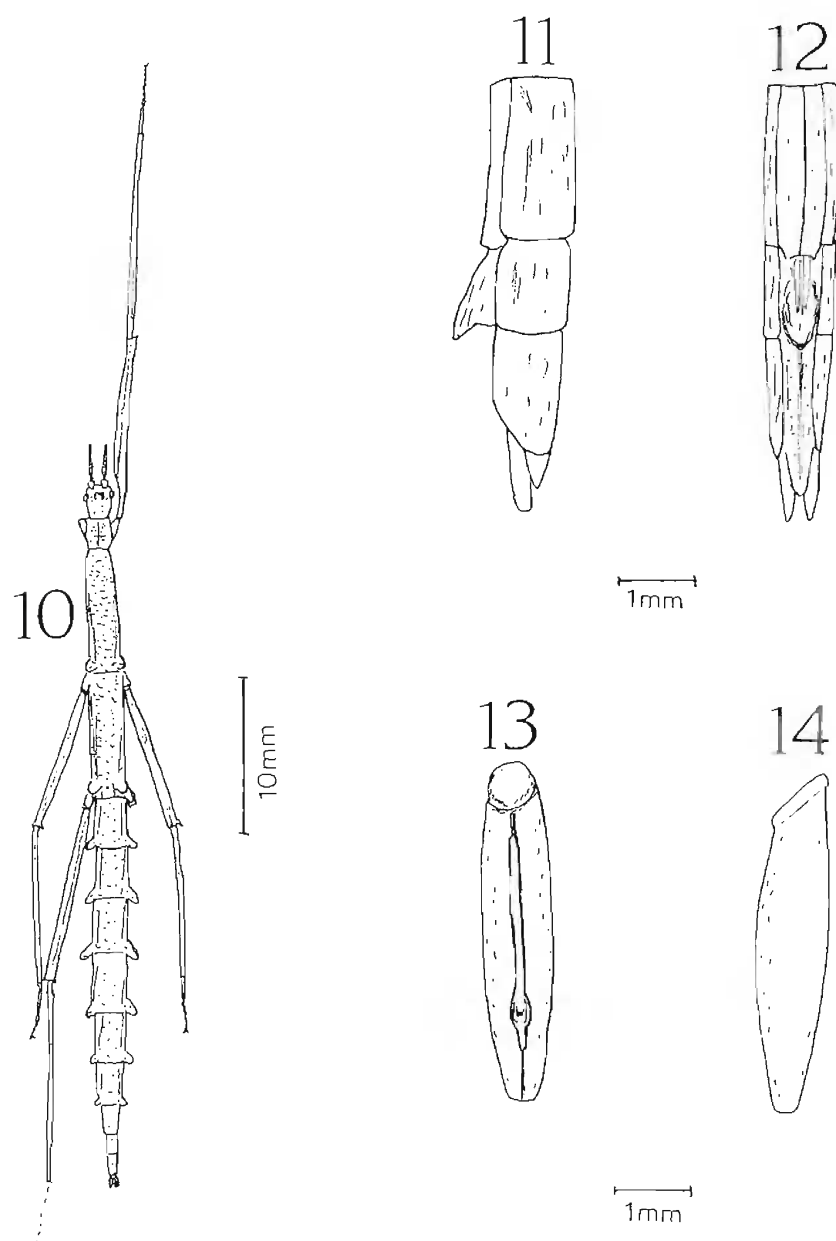
Female (Figs. 10-12)

Holotype: small, robust-looking apterous species, with very short antennae. Whole body dark brown, rugose and conspicuously granulated. Body length 46mm.

Head slightly longer than wide, with pair of slightly separated tubercles and lobes between eyes. Antennae very short, with nine segments; second segment greatly reduced in length and third segment much longer than others.

Pronotum shorter than head, with central indentation. Mesonotum four times length of pronotum. Metanotum slightly shorter than mesonotum; median segment short. Conspicuous, well spaced paired lobes at hind part of mesonotum and metanotum.

Abdomen with series of robust lateral lobes on abdominal segments 2-7. Abdomen



Figs 10-14. *Gratidiinilobus capensis* n.sp.

10. Holotype ♀. 11-12. Female abdomen: 11. lateral, 12. ventral.

13-14. Egg: 13. dorsal, 14. lateral.

elongate, narrowing towards tip (8th-10th segments). End of anal segment truncate. Supra-anal plate visible beneath. Operculum short, reaching end of 8th abdominal segment, with valvulae extending beyond that (Figs 11-12). Cerci of moderate length, rounded at tip.

Legs plain, indistinct darker mottling. All femora with short pair of apical spines. Left fore leg and right hind leg missing.

Paratype females (3 specimens). Same as holotype except slightly shorter. One is more slender with slightly less pronounced lobes; whole body also with whitish markings or dusting, and legs clearly mottled.

Male (Figs. 15-17)

Paratype: small, slender apterous insect, with short antennae. Body brown, with greyish mottling on abdomen and slightly mottled banding on mid femora and tibiae. Abdomen rugose

and sparsely granulated. Body length 33.5mm.

Head longer than wide, with swollen area between eyes. Antennae short, reaching half length of fore femora; ten segments; basal segment broadened; second segment greatly reduced in length and third segment much longer than others.

Pronotum slightly shorter than head, with central indentation. Mesonotum slightly granulated, less than four times length of pronotum. Metanotum slightly granulated; equal in length with mesonotum if median segment included. Conspicuous, well spaced paired lobes at hind part of mesonotum and metanotum.

Abdomen with series of robust lateral lobes on abdominal segments 2-8. Abdomen elongate. End of anal segment subtruncate. Subgenital plate narrowing to almost pointed tip, reaching end of 9th abdominal segment (Figs 16-17). Cerci reasonably long, incurved, with subbasal lobe.

Legs as in female.

Egg (Figs 13-14).

Operculum missing (nymph has obviously emerged). Capsule elongate, whitish brown with black and darker flecks marked with a reticulate pattern. Operculum slanting. Micropylar plate elongate, rather narrow, black-rimmed; plate starting from near rim of operculum and reaching about three quarters length of capsule. Median line continuing to opercular rim and end of posterior pole. Capsule length 3.8mm, height 0.8mm, width 0.8mm.

As with other related genera, it appears that eggs are glued to suitable surfaces, such as branches, leaves or in crevices.

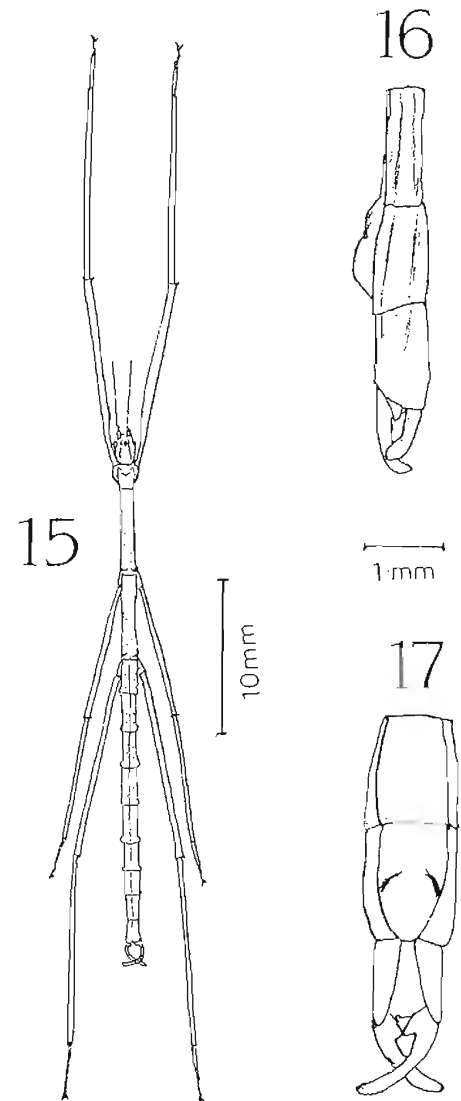
Measurements

Holotype ♀ (in mm): Body length 46, Head 2.5, Antennae 4, Pronotum 2, Mesonotum 8, Metanotum 7, Median segment 1, Femora: fore 12, mid 9, hind 11. Tibiae: fore 13, mid 10, hind 13. Cerci 1. Two of the ♀ paratypes are 44mm, with only slightly reduced head, thorax and abdomen. The other damaged ♀ in BMNH is 52mm. ♂ Body length 33.5, Head 1.7, Antennae 4.5, Pronotum 1.5, Mesonotum 5.5, Metanotum 4.5, Median segment 1, Femora: fore 12, mid 8.5, hind 12. Tibiae: fore 12, mid 8, hind 12. Cerci 1.6.

Type material

Holotype ♀, South Africa: 14m[iles]. E. Middelburg, C. Prov[ince], 8-14.xii.1969 (Furst) (SANC).

Paratypes: ♀, South Africa: 14m[iles]. E. Middelburg, C. Prov[ince], 8-14.xii.1969 (Furst) ♀, SOUTH AFRICA: Bethesdaweg, nr. Nieu-Bethesda, 31.54S, 24.45E, 8.ii.1990 (M.



Figs 15-17. *Gratidiinilobus capensis* Male. 15. dorsal view. 16-17. End of abdomen: 16. lateral, 17. ventral.

Jonsson) [with egg attached to end of abdomen] (both SANC); ♂, South Africa: Cape Province, between Aberdeen and Somerset East, 18.x.1955, B.P. Uvarov (BMNH reg. no. B.M. 1955-751); ♀, South Africa: Longhope [Cape Province], xii.1926, Mrs. Ethel Gough (BMNH reg. no. B.M. 1927-280).

Distribution

So far only known from a small part of Eastern Cape.

Etymology

From [Eastern] Cape Province.

Maransis Karsch

Maransis Karsch, 1898: 365, 381. Type species. – *Bacillus mozambicus* Westwood, 1859, by monotypy.

Maransis; Kirby, 1904: 336; Rehn, 1911: 332; Otte & Brock, 2003: 275.

Maransis Karsch, 1898 is considered to be a valid genus, quite distinct from *Leptynia* Pantel, 1890, although Rehn (1911) synonymised them. Females of the African genus *Maransis* have conspicuous lateral tubercles on the thorax, unlike the European *Leptynia* species. Genitalia also differ (Brock, revision of South African species, including detailed differentiation between European species, in progress).

Maransis browni n.sp., Figs 18-23.

Male (Figs. 18, 20 & 21)

Holotype: medium sized uniform yellowish brown elongate insect with bold longitudinal central black stripe from head to front of mesonotum. Body length 70mm.

Head elongate, longer than wide, smooth. Eyes dark blackish-brown. Black central stripe and two lateral lines present. Antennae short, less than half length of femora, with 19 segments. Basal segment broader, second segment reduced in length.

Thorax elongate, smooth. Pronotum slightly shorter than head, with bold black central stripe. Clear central indentation. Mesonotum more than 5.5 times length of pronotum towards end; also with shorter lateral black lines. These lines also present at hind part of segment. Metanotum longer than mesonotum, again with black central and lateral lines present at start and hind part of segment. Median segment short.

Abdomen elongate, smooth. Segments of similar length until shorter, swollen 8th segment. Ninth segment longer than 8th and very swollen, narrowing towards anal segment. The anal segment sharply broadened towards tip, hind margin double lobed. Cerci long, incurved, rounded at tip. Subgenital plate broad and swollen, end not quite rounded, almost reaching end of 9th abdominal segment (Figs 20-21).

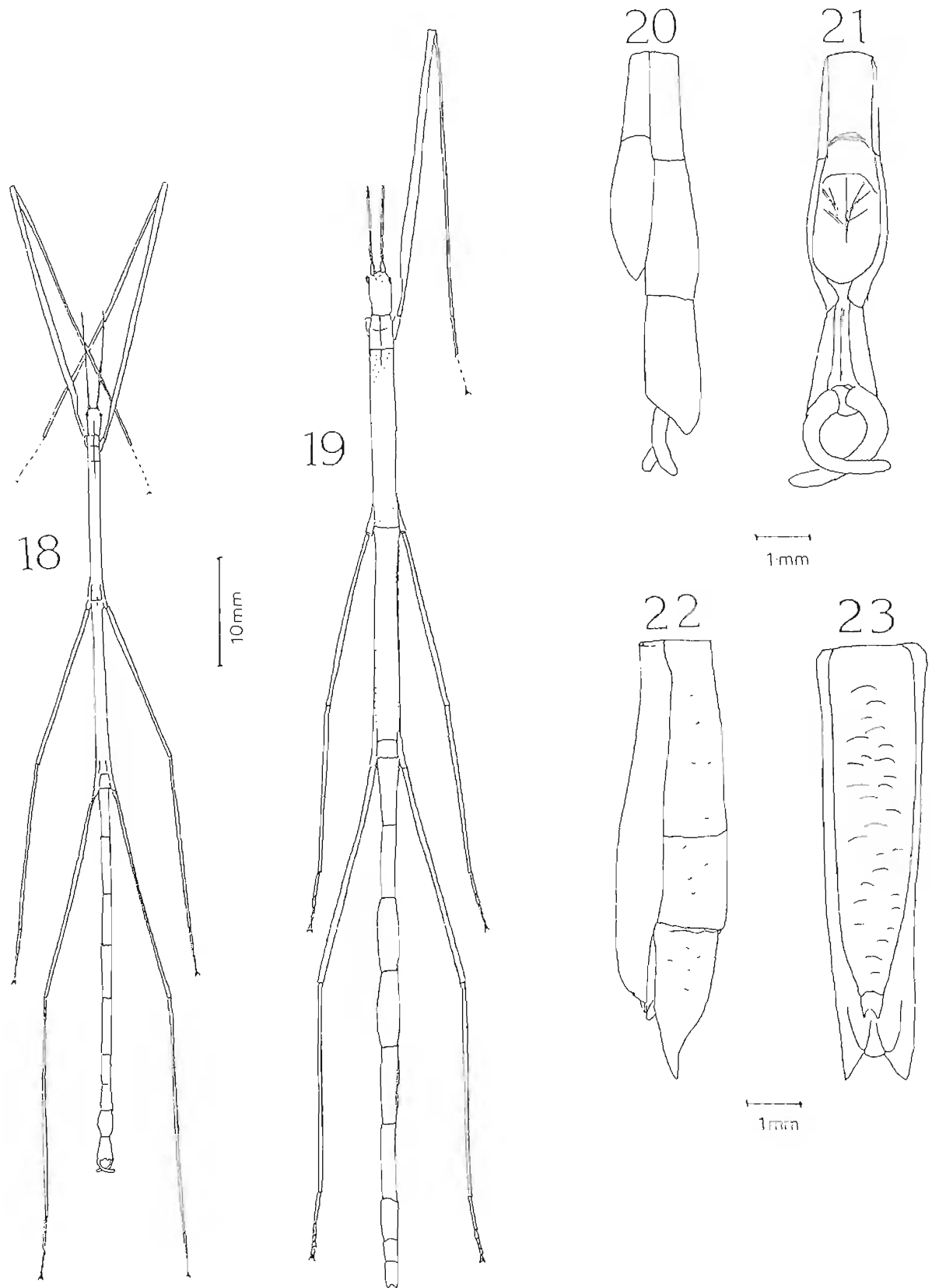
Legs plain, elongate.

Female (Figs. 19, 22 & 23)

Paratype female: medium sized uniform yellowish-brown elongate insect with bold black stripe from pronotum to front of mesonotum. Numerous small tubercles laterally on mesonotum, rather smaller on metanotum. Body length 93mm.

Head as in male, but lacks black central stripe.

Thorax as in male except mesonotum five times length of pronotum. Black central line continuing for 1.5mm. Mesonotum with numerous tubercles laterally, typical for the genus; otherwise dorsal surface sparsely granulated, particularly on upper part. Metanotum also with



Figs 18-23. *Maransis browni* n.sp.

18. Holotype male. 19. Female. 20-23. End of abdomen: 20-21. ♂, 22-23. ♀.

series of granulations laterally; longer than mesonotum.

Abdomen with segments of similar length until shorter 8th segment, slightly swollen, then tapering to much shorter 9th segment. Anal segment slightly longer than 9th, almost triangular incised, giving the appearance of a double pointed tip. Operculum elongate, end subtruncate, not reaching half the length of anal segment. Cerci of moderate length, concealed beneath anal segment (Figs 22-23).

Legs as in male. Left fore leg missing.

Measurements

All measurements in millimetres. Holotype ♂: Body length 70, Head 2.5, Antennae 9, Pronotum 2.2, Mesonotum 12.5, Metanotum 15.8, Median segment 1.2; Femora: fore 24, mid 15, hind 19; Tibiae: fore 25, mid 15, hind 20. Cerci 2.5. Paratype ♀: Body length 93, Head 4, Antennae 8, Pronotum 3, Mesonotum 16, Metanotum 19.5, Median segment 1.5; Femora: fore 26, mid 16, hind 20; Tibiae: fore 26, mid 15, hind 19. Cerci 0.8.

Type material

Holotype ♂, South Africa: 21m[iles] NW of Kuruman, N. Cape, 7.ii.[19]61 (H. Dick Brown) (SANC). Paratype ♀, South Africa: 21m[iles] NW of Kuruman, N. Cape, 7.ii.[19]61 (H. Dick Brown) (SANC).

Distribution

So far only known from the type locality near Kuruman in Northern Cape Province.

Notes

Closely related to other South African *Maransis* species, including the type species *M. mozambicus* (Westwood, 1859). The plain coloration and length of the dorsal black median line in the new species, readily distinguishes it from other taxa.

Etymology

Named after the collector Dick Brown, a noted South African entomologist who has made contributions in several fields of orthopterology, including many new South African species.

Acknowledgements

I thank the following individuals for assistance and (in the case of the SANC and TMSA) the loan of material: B. Dombrowsky (TMSA), G. Beccaloni, J. Marshall, D. Vane-Wright (BMNH), H. Robertson (SAMC), R. Urban (SANC). N. Cliquennois (Réunion) alerted me to problems with the validity of *Gratidia*. Mrs Dombrowsky kindly arranged accommodation. In addition to the above, many other museum collections in Europe, South Africa and elsewhere have been checked for African species, with thanks to the curators.

References

- Bates, H.W. (1865) Descriptions of fifty-two new species of Phasmidae in the collection of Mr W Wilson Saunders, with remarks on the family. *Transactions of the Linnaean Society of London*, **25**(1): 321-359.
- Bradley, J.C. & Galil, B.S. (1977) The taxonomic arrangement of the Phasmatodea with keys to the subfamilies and tribes. *Proceedings of the Entomological Society of Washington*, **79**: 176-208.
- Brock, P.D. (1999) *The Amazing World of Stick and Leaf-Insects*. The Amateur Entomologists' Society, Orpington. The Amateur Entomologist Vol. **26**.
- Brock, P.D. (2004) Taxonomic notes on giant southern African stick insects (Phasmida), including the description of a new *Bactrododema* species. *Annals of the Transvaal Museum*, **41**: 61-77.
- Brunner von Wattenwyl, K. (1893) Révision du système des Orthoptères et description des espèces rapportées par M. Leonardo Fea de Birmanie. *Annali del Museo Civico di Storia Naturale "G. Doria" Genova*, **13** (2): 1-230.

- Brunner von Wattenwyl, K. (1907) In: *Die Insektenfamilie der Phasmiden II* (Brunner von Wattenwyl, K. and Redtenbacher, J., 1906-1908), pp.181-338, plates 7-15, Verlag Engelmann, Leipzig.
- Carl, J. (1913) Phasmides nouveaux ou peu connus du Muséum de Genève. *Revue Suisse de Zoologie*, 21(1): 1-56, pl. 21.
- Cliquennois, C. (in press) À propos des Gratidiini: notes critiques (Phasmatodea, Anareolatae). *Bulletin de la Société Entomologique de France*.
- Karsch, F. (1898) Vorarbeiten zu einer Orthopterologie Ostafrika's. 1. Die Gespenstheuschrecken, Phasmodea. *Entomologische Nachrichten Berlin* 23: 359-383.
- Kirby, W.F. (1896) On some new or rare Phasmidae in the collection of the British Museum. *Transactions of the Linnean Society of London*, 6(2): 447-475.
- Kirby, W.F. (1904) *A Synonymic Catalogue of Orthoptera. Vol. I, Orthoptera, Euplexoptera, Cursoria, et Gressoria (Forficulidae, Hemimeridae, Blattidae, Mantidae, Phasmidae)*. Longman & Co, London.
- Otte, D. & Brock, P. (2003) *Phasmida Species File. A Catalog of the Stick and Leaf Insects of the World*. The Orthopterists' Society.
- Pantel, J. (1890) Notes Orthoptérologiques. *Anales de la Sociedad Española de Historia Natural*, 19: 335-422, plates 3-4.
- Redtenbacher, J. (1906) In: *Die Insektenfamilie der Phasmiden I. Phasmida Areolatae* (Brunner von Wattenwyl, K. and Redtenbacher, J. (1906-1908). pp. 1-180, pls. 1-6. W. Engelmann, Leipzig.
- Rehn, J.A.G. (1911) Records and descriptions of African Mantidae and Phasmidae (Orthoptera). *Proceedings of the Academy of Natural Sciences Philadelphia*, 319-335.
- Rehn, J.A.G. (1933) Dermaptera and Orthoptera of the de Schaunsee South African Expedition. *Proceedings of the Academy of Natural Sciences Philadelphia*, 85: 61-66, pl. 1.
- Schulthess Schindler, A. de (1898) Orthoptères du pays des Somalis, recueillis par L. Robecchi-Birchetti en 1891 et par le Prince E. Ruspoli en 1892-93 déterminés et décrits. *Annali del Museo Civico di Storia Naturale "G. Doria" Genova*, 19(2): 1-56.
- Stål, C. (1858) Orthoptera och Hemiptera från södra Afrika. *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*, 15: 307-320.
- Stål, C. (1875a) Recherches sur le systeme des phasmides. *Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar*, 2(17): 1-19.
- Stål, C. (1875b) *Recensio Orthopterorum. Revue critique des Orthoptères décrits par Linné, de Geer et Thunberg*. Vol. 3. P.A. Norstedt & Söner, Stockholm.